# T16D06 – (16.1) Rate Expression

Name ……………………………………………………..

1. 16.1.1 Distinguish between the terms rate constant, overall order of reaction and order of reaction with respect to a particular reactant. (2)
   1. Describe the Rate Constant:
      1. What does the value of k (low or high) indicate?
   2. Explain the Overall Order of Reaction:
   3. Explain the Reaction Order with respect to a particular reactant:
2. 16.1.2 Deduce the rate expression for a reaction from experimental data. (3)
   1. What is the generic rate expression for the reaction: A + B 🡪 C + D
   2. How is the rate expression different when using = or ∝
   3. What are the two main uses for rate expressions:
   4. Describe the overall order and order with respect to each reactant in the following equation:

2A + B + C 🡪 2D + E Rate = k[A][B]2[C]0

* 1. The following expression is at 800K: Rate = k[A]2[B] Calculate the rate constant (to 1 decimal place)

Initial rate was 55.0x10-5 when:

[A] = 3.00x10-2

[B] = 6.00x10-2

* 1. Explain how you can experimentally determine the rate expression for A + B 🡪 C + D

1. 16.1.3 Solve problems involving the rate expression. (3)
2. 16.1.4 Sketch, identify and analyze graphical representations for zero-, first- and second-order reactions. (3)

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| --- | --- | --- | --- |
|  | **Zero Order** | **1st Order** | **2nd Order** |
| **[reactant]/time** |  |  |  |
| **rate/[reactant]** |  |  |  |
| **rate/[reactant]2** |  |  |  |
| **ln[reactant]/time** |  |  |  |
| **(1/[reactant])/time** |  |  |  |

1. Half-life for 1st order reactions:
   1. What is the equation for the half-life of a 1st order reaction?
   2. The half-life of a 1st order reaction is 100 seconds calculate its rate constant:
   3. A 1st order reaction has a rate constant of 0.100s-1 calculate the half-life:
   4. Draw a graph of [reactant]/time for changing constants (k)